2/27/86
C2150-3

FEBRUARY 1986

AUTOMOTIVE INDUSTRIES

SINCE 1896

MAN OF THE YEAR

Vincent A. Gennaro
President, Mazda

mazda
N AMERICA

DETROIT

CE014-1------J-
JOS MCNALLY 999999 JAN87
CONSPECSIONAL INFO SERV COPY #1 S 3DG
SUITE 300
4520 EAST WEST HWY
BETHESDA MD 20814

FEBRUARY 1986 VOLUME 166, No. 2

CHILTON'S AUTOMOTIVE INDUSTRIES SINCE 1896

Mazda president Kenichi Yamamoto
Cover by Randy Hamblin

COVER STORY

46 MAN OF THE YEAR
-We trace the amazing career of Mazda president Kenichi Yamamoto.

FEATURES

52 SUPRA SURPRISE!
Toyota dials both dollars and dazzle into its performance flagship.

55 ROCHESTER GIVES GM A MULTEC INJECTION
The General's new patented fuel injectors are born and built in the USA!

58 '86 ANALYST SURVEY

60 SCORPIO ASCENDANT: PILOTING FORD EUROPE'S BIMMER-BASHER
Can Merkur's German-built top cat drive the competition autobahnanas?

63 BUILDING SCORPIO
A look at Scorpio's birthplace, Ford Europe's Niehl assembly plant.

66 SAAB'S 9000: FIRST LOOK AT A SIZZLING SWEDE
No meatballs at this table, sport.

69 STROLLING THROUGH TROLLHATTAN
Being there: The birth of a Saab 9000.

77 TWO PORTENTOUS PREDATORS POUNCE ON THE PICKUP PARADE
Chrysler's mid-size Dakota and Nissan's first US-designed pickup arrive.

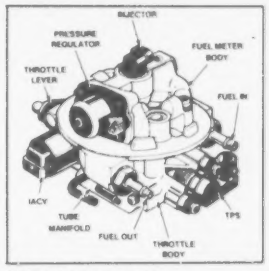
82 AUTOMAKER QUARTERLY REPORT

87 AUTO-RAILING GOES HIGH TECH

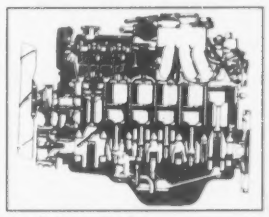
91 THE INSIDER'S GUIDE TO AUTOMOTIVE BUZZWORDS

94 CHRYSLER CONNECTS THE DOTS
Chrysler's treasurer talks diversification and holding companies.

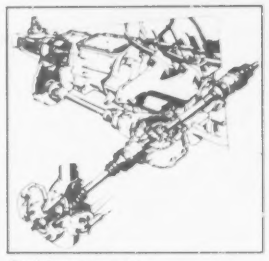
97 FORD'S TAURUS BEST-IN-CLASS LIST: PART TWO



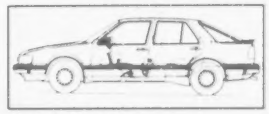
Multec Injection—p. 55



Toyota Supra—p. 52



Ford Scorpio—p. 60



Saab 9000—p. 66

New Trucks—p. 77

NEWS

Newsline: GM/Lotus Connection 7

Marketdata: Nova vs. Corolla Sales 17

Dateline: Productivity Among Automakers 23

DEPARTMENTS

Editorial: A Sign of The Times 5

Callahan's Auto Report: Roles Of ChryCo's Bidwell 21

Managing for Quality: The Competitive Edge 102

Technolog: Composite Window 107

Computer Technology Ford's CAD/CAM 116

Materials Polyurethane Growth 120

New Products SAE Preview 127

Technical Literature SAE Preview 142

AIAG: Computerized Communications 144

Letters Spyflash! 147

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Company is a division of American Broadcasting Companies Inc., New York, NY. Subscription rates and single copy prices on request. Second Class Postage paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 1441, Riverton, NJ 08077. Chilton Company, 1985. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/85 $1.00 + 25¢)

ONE OF THE ABC PUBLISHING COMPANIES

Toyota Tops Vehicles Per Employee Ranking

by John McElroy

An *AI* survey of 1985 production and employment shows that Toyota, Ford North American Operations and Ford Europe are the most efficient automakers in Japan, the United States and Europe, respectively. It also shows that despite the tremendous modernization and automation programs undertaken in North America and Europe over the last five years, there has been little, if any, gain on the Japanese.

The survey evaluates how many employees a car company needed to build the vehicles it produced last year. It includes salaried as well as hourly employees to reflect the efficiency of the total corporation.

1985 PRODUCTIVITY RANKING BY AUTOMAKER

Company	Employment	Production	Vehicles/Employee
Toyota	61,665	3,535,495	57.3
Mitsubishi	23,000	1,096,156	47.6
Mazda	28,256	1,330,211	47.0
Nissan	58,925	2,473,191	41.8
Subaru	13,500	550,000	40.7
Honda	31,000	1,252,000	40.3
Ford	157,300	3,511,190	22.3
Chrysler	115,880	1,870,118	16.1
AMC	22,751	357,380	15.7
GM	544,500	7,296,155	13.3
Ford Europe	82,926	1,288,541	15.5*
Austin Rover Grp.	38,000	476,000	12.5
Peugeot	99,700	1,048,300	10.5*
Renault	157,696	1,649,766	10.4*
Fiat/Lancia	143,944	1,494,100	10.3*
GM Europe	127,600	1,300,000	10.1
VW/Audi	160,651	1,474,573	9.2
Citroen	60,700	551,700	9.0*
BMW	51,000	445,233	8.7*
Volvo	67,800	475,600	7.0
Saab	32,500	148,000	4.4
Daimler-Benz	199,000	751,929	3.7
Yugo	22,000	50,000	2.2

** = 1984 figures.*

What The Figures Mean

The numbers listed with each company measure how many cars were produced per employee. Yet, they've been adjusted to discount employees who are not involved in vehicle production, such as those with Ford's Aerospace division and GM's Hughes Electronics. The figures only represent each company's production and employment in Japan, North America and Europe and not on a worldwide basis.

The figures also include truck and bus production for those companies that produce them, which tends to lower their ranking since these vehicles are more labor intensive than automobiles. And there is no adjustment for the level of outsourcing at any company. This particularly penalizes GM, which produces 70% of its parts in house. Most Japanese companies produce 30% of their parts in-house. If outsourcing is factored into GM's figure, for example, it would be producing about 22 cars per employee.

Some of the European figures are based on 1984 production levels, which could tend to lower their productivity ranking.

Interestingly, companies in a given geographical area have levels of efficiency that are relatively the same. And though the survey is a simple one, it shows that the productivity differences between automakers in Japan, North America and Europe are strikingly different. AI

New Escort Will Get Low-cost British ABS

by Peter J. Mullins

A low-cost antilock braking system (ABS) supplied by Lucas Girling will be available as an option on European model Ford Escorts during the 1986 model year, *AI* has learned. It is believed that this is the first small car to be fitted with an ABS.

The Girling Stop Control Braking System (SCS), which is entirely hydraulic in operation and utilizes no electronics, was announced about a year ago and is specifically aimed at the small car market.

"Our aim is to bring sophisticated wheel lock control within the scope of the small-to-medium car manufacturer," notes a Girling spokesman. "Such cars are typically fitted with dual 'X-split' [diagonally-split] braking."

Girling points out that in Europe, the size and type of car for which this system is suited constitutes 60% of the total passenger car market.

Advantages claimed for SCS are that under normal or emergency braking the car retains directional stability on road surfaces which have differing adhesion levels, even when these differ from front to rear or left to right on the vehicle. Steering control is also retained, even when brak-

(Continued on p. 26)

Three US Cars Get "Gas Guzzler" Fine

by Joseph M. Callahan

For the first time, three domestic cars have been slapped with "gas guzzler" labels by the Environmental Protection Agency (EPA). All three are Chrysler M-body cars—the Dodge Diplomat, Chrysler 5th Avenue and Plymouth Gran Fury. The EPA also imposed the label on 17 foreign cars.

Buyers of "gas guzzlers" must pay a tax of $500 to $3850 per car at time of purchase.

It should be pointed out, however, that not every model of these 20 cars will be subjected to the fines—only those models that fail to get a minimum of 22.5 mpg (*10.4 L/100 km*). Unless the law is changed, 22.5 mpg will be the "gas guzzler" figure from now on.

Quite a number of other cars sold in the US with mileage under 22.5 mpg are exempt from the tax, either because they are marketed as emergency vehicles or because they weigh over 6000 lb (*2721.6 kg*). All four Rolls Royce models and some GM station wagons, for example, are exempt for the latter reason.

1986 GAS GUZZLERS

Car	Mpg	Fine
Porsche 911	21.7	$ 500
Chrysler Fifth Avenue	21.6	$ 500
Dodge Diplomat	21.6	$ 500
Plymouth Gran Fury	21.6	$ 500
BMW 5 Series	21.2	$ 650
BMW 6 Series	21.2	$ 650
BMW 7 Series	19.7	$ 850
Jaguar XJ6	19.7	$ 850
Mercedes 560 SL	17.7	$1300
Ferrari Mondial Cabriolet	17.2	$1500
Ferrari 328 GTS	17.2	$1500
Maserati Biturbo Spyder	16.8	$1500
Maserati Biturbo	16.8	$1500
Maserati Biturbo 425	16.8	$1500
Jaguar XJ-S	16.7	$1500
Ferrari Testarossa	13.5	$2700
Lamborghini Countach	8.8	$3850

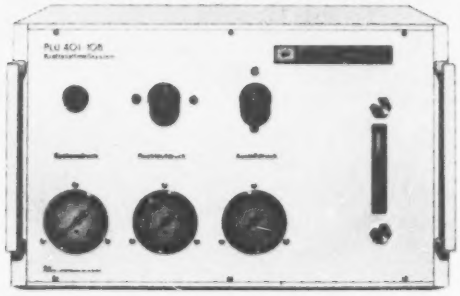
Quite a few 1986 cars would be "gas guzzlers" if one only considered the Department of Energy's 1986 Gas Mileage Guide. The highway and city mileages of these new models would seem to put them in the gas-guzzler class, but in actuality do not.

Robert Maxwell, director of EPA's Certification Division in Ann Arbor, MI straightened out this apparent contradiction, saying the Government calculates two figures for each car. The mileage used to identify "gas guzzlers" is calculated in the EPA's Certification Laboratories under ideal and uniform conditions.

The other mileage figure, which is published in the Mileage Guide and is printed on each new car's window, reflects what a wide variety of drivers

(Continued on p. 35)

Guaranteed Dynamic Flow Measurement ...Only from Pierburg



Now . . . get guaranteed high accuracies at high confidence levels during runs of only a few seconds.

We can now supply you with flow meters and systems calibrated against master standards at various flow rates and measuring times. Plus, we'll supply a graphic presentation of FLOW RATE vs. UNCERTAINTY and LINEARITY DEVIATION, so that you can be assured of measurements at confidence levels up to 99+%. The following table lists typical examples.

MODEL	TYPICAL ACCURACY	FLOW RATE	MEASURING TIME	CONFIDENCE LEVEL
PLU-103A	±0.25%	10 ml/min	3 sec.	95%
PLU-116H	±0.5%	100 ml/min	15 sec.	95%
PLU-401/108	±1%	500 ml/min	10 sec.	99+%

Pierburg Metering Systems, Inc. PLU GmbH

See us at SAE Booth 569.
Input #115 on Reader Action Card

Stanley can latch your hood, your doors, your trunk more efficiently than anyone.

Stanley Industrial Hardware can supply you with quality auto latch and hinge assemblies *in volume* and *on time.* Learn why you should open and close with the best of them. Stanley Industrial Hardware, Division of The Stanley Works, New Britain, CT 06050.

STANLEY helps you do things right.®

Input #116 on Reader Action Card

(Continued from p. 33)
might get driving under different conditions.

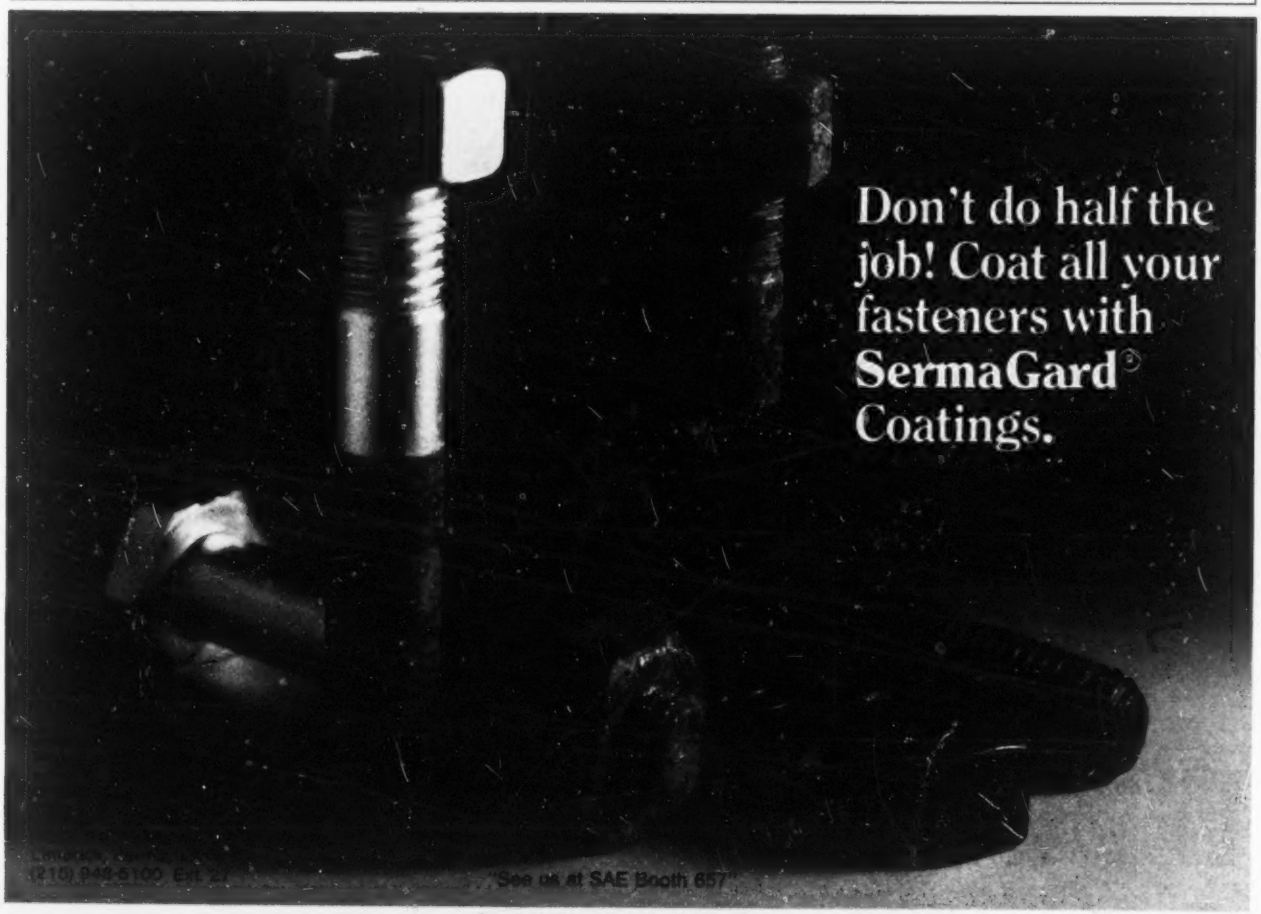
This is based on 90% of the city figure and 78% of the highway figure which the EPA lab calculates. That's why some low mileage cars, including Corvette, Cadillac and Lincoln, are not counted as "guzzlers."

And while the "gas guzzler" designation is based on the performance of each model (depending on weight, powertrain, etc) of each line of cars, the Corporate Average Fuel Economy (CAFE) is based on a company's entire fleet of cars after they're sales-weighted at the end of the year.

As a result, even though General Motors and Ford Motor Co. are still subject to corporate fines because they've failed to meet the CAFE numbers, they have no 1986 "gas guzzlers." Chrysler's M-cars are guzzlers, in spite of a fleet average which is well over the 1986 mandated CAFE mileage figure of 26 mpg. AT

Musda? 626? Maztang?

This badgeless two-door coupe is either a future Mazda or the new Mazda-built Mustang, which Ford is hoping to source from Mazda's forthcoming Flat Rock, MI assembly plant. Under the mystery car's bulged fenders are a turbocharged four-cylinder engine and antilock brakes. Could this be the future Flash from Flat Rock, or simply a new-generation 626 coupe?



Input #118 on Reader Action Card

ANALYST SURVEY '86

We ask the nation's top auto analysts to take their best shots at what 1986 will bring.

by Mary Ann Angeli

This year will see 14.8 million passenger car and light truck sales in the United States, according to *AI*'s annual survey of automotive analysts. The figure breaks down to 10.6 million car sales and 4.2 million light trucks.

Passenger car production should run about 7.8 million units, with light truck production coming in at 3.3 million for a total of 11.1 million units.

George Peterson at J. D. Power & Associates, which forecast a high 11.3 million passenger car and 4.6 million light truck sales for '86, commented, "The overall economy will continue to be strong throughout the 1986 calendar year. Interest rates and inflation will remain relatively stable at low rates. Unemployment will also remain stable. Per capita income will slowly increase, so the underpinnings look good for continued strong vehicle sales."

Peterson added that the loosening of the VRA has "forced the market back into a much more competitive mode. As the Japanese volume increases, their artificially high transaction prices experienced over the last few year are expected to drop away.

"As these cars become more affordable, the domestic manufacturers must respond with reductions in the transaction prices of their car through interest rate incentives, longer warranties, discount option packages or rebates. This competition will bring buyers back into the new vehicle market."

Adds William Pochiluk of Autofacts, "It is expected that Japanese imports will be increasingly restrained by political pressures. This will intensify as the market softens. We project a richening mix of imports." AI

Who Says How Many
(Units/Millions)

Sales figures are for both US and imported cars and trucks, production figures unless otherwise noted are US domestic.

	Passenger Cars		Light Trucks	
Company	Sales	Production	Sales	Production
American Motors Corp.	10.3	NA	4.2	NA
AP Parts Co.	10.4	7.2	3.9	2.8
Arthur D. Little Inc. Automotive Unit	10.5	7.3	4.0	3.3
AutoFacts Inc.	10.2	7.2	4.3	3.1
Automotive Information Council	10.4	7.5	3.9	3.2
Chase Econometrics	10.5	NA	4.3	NA
Chrysler Corp.	10.5	NA	4.4	NA
Ford Motor Co.	10.4	7.4	4.2	3.0
General Motors Corp.	10.5	NA	4.5	NA
Integrated Automotive Resources Inc.	10.5	8.8*	4.2	4.4*
J. D. Power & Associates.	11.3	7.9	4.6	3.8
Manufacturers Hanover Trust Co.	10.4	7.5	NA	NA
Paine Webber	11.4	8.1	4.2	3.1
Research Bernstein	12.4	9.1	4.1	3.3
Average	**10.6**	**7.8**	**4.2**	**3.3**

**North American only*

AUTOMAKER QUARTERLY REPORT

Our first report offers production and sales results through December '85 including an overview of financial happenings among the carmakers.

Domestic Auto Sales

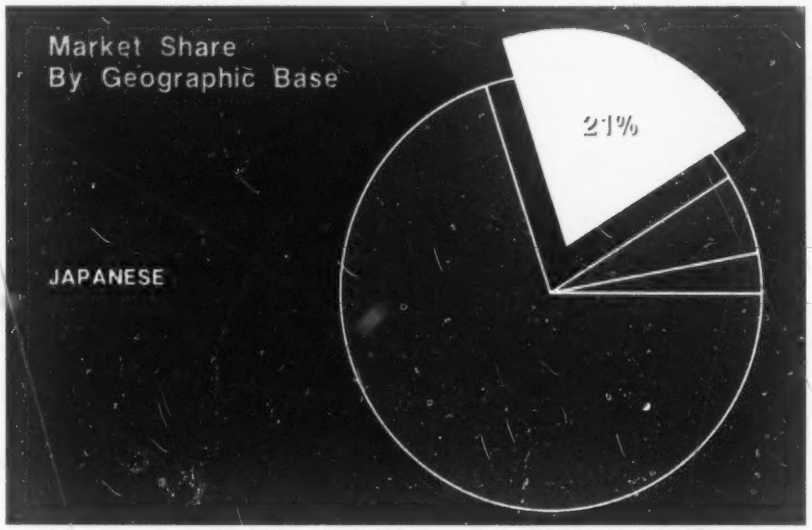
Carline	'85	'84	% Change
Cavalier	431,031	377,545	14.2%
Escort	420,690	353,578	19.0%
Celebrity	363,619	322,189	12.9%
Ciera	333,585	242,209	37.7%
Tempo	281,144	256,532	9.6%
Accord*	268,420	256,650	4.6%
Chevrolet	245,826	258,902	-5.1%
Century	234,508	217,042	8.0%
Sentra*	219,024	---	---
Supreme	217,504	302,087	-28.0%
Camaro	199,985	202,172	-1.1%
Olds 88	188,129	258,293	-27.2%

* Includes imports

'85 Domestic Light Truck Production

Truckline	2nd Qrt.	3rd Qrt.	4th Qrt.
Chrysler/Vans	35,939	19,864	29,260
Sport Util.	7,538	5,773	5,757
Miniwagon	74,958	58,348	17,680
Lt. Convtl.	120,733	104,048	49,403
Ford/Aerostar	1,808	15,134	32,317
Bronco	13,791	11,879	13,257
Econoline	64,757	41,104	61,523
Ranger	72,221	51,959	58,287
Bronco II	28,097	22,899	30,660
Lt. Convtl.	173,508	133,945	140,952
Chevy/Blazer	11,531	10,136	12,025
Suburban	18,059	16,387	12,271
P-Model	12,977	7,034	8,649

Truckline	2nd Qrt.	3rd Qrt.	4th Qrt.
S-10	60,469	60,833	49,287
Blazer S	53,744	53,298	46,090
Astro	35,926	31,609	33,845
Van	49,667	34,026	48,987
Lt. Convtl.	120,733	104,048	106,056
GMC/Jimmy	3,045	2,577	3,093
Suburban	6,452	6,457	4,746
P-Model	2,104	1,368	847
S-15	16,378	15,797	12,568
Jimmy S	14,593	13,875	5,596
Safari	9,576	8,259	8,284
Van	15,109	9,951	12,599
Lt. Convtl.	42,520	36,269	35,411
Nissan Pickup	22,386	28,103	29,908



Passenger Car Market Share By Geographic Base

Manufacturers	Total Sales	Total Market Share
American	7,830,535	69.90%
Japanese	2,381,900	21.26%
European	617,516	5.51%
US Built Imports (VWoA, Honda, Nissan, Renault)	371,142	3.31%
Total	11,201,093	99.98%

Passenger Car Market Shares To Date

Manufacturer	Sales	% Total
General Motors	4,692,318	45.65%
Ford	2,079,456	20.23%
Chrysler	1,245,149	12.11%
Toyota	614,576	5.98%
Nissan	572,847	5.57%
Honda	552,389	5.37%
VW	214,770	2.09%
Subaru	178,175	1.73%
AMC/Renault	130,284	1.27%

Information compiled by Integrated Automotive Resources Inc., Wayne, PA.

C2150-3

CHILTON'S

MARCH 1986

AUTOMOTIVE INDUSTRIES

SINCE 1895

P-Shooter

CE014-1-----J-
999999 FE897
JOS MCNALLY COPY #1 S
CONGRESSIONAL INFO SERV DIR
4520 EAST WEST HWY
SUITE #00
BETHESDA MD 20814